

*Chad AS Cont'd*

70. In a process for the polymerization of olefins in the presence of an olefin polymerization catalyst, the improvement comprising:  
selecting as said olefin polymerization catalyst an olefin polymerization catalyst comprising the catalyst composition of claim 47.

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**REMARKS**

Claims 21-70 are pending. Favorable reconsideration is respectfully requested.

Claims 1-20 have been canceled in favor of newly added claims 21-70. The newly added claims were drafted with the former rejections under 35 U.S.C. § 112 in mind, and Applicants believe the newly added claims fully comply with the statute. Applicants submit that the former rejections under 35 U.S.C. § 112 are no longer tenable.

Newly added claims 31 to 35 and 36 to 51 claim catalyst compositions containing the catalysts of former claims 1 to 10, along with an activating co-catalyst, preferably an aluminum alkyl or alumoxane. Support for these claims may be found in the specification on page 7, line 7 to page 9, line 8, and in the Examples. Thus, no new matter is added by virtue of the presentation of these claims.

The Declaration was objected to. Accordingly, a new Declaration accompanies this response. Withdrawal of the objection to the Declaration is respectfully requested.

The specification was objected to because of minor informalities with respect to the structural formulae. In addition, Applicants have noted some additional informalities. The amendment to page 4 of the specification corrects these informalities by replacing the pyridinyl and quinolinyl catalyst structures with new structures containing proper brackets. The structures for the aminoalkyl, phosphinoalkyl, and oxyalkyl linking groups have also been corrected. Finally, the word "comparative" has been removed from page 12, line 10, and from the tables. As can be seen from Table 2, Example 11, the bis(quinolinyl) compound did indeed possess catalytic activity. Moreover, this compound is within the scope of the claims

as filed. See, e.g., claim 1, when L is quinolinyl or when a is 2. No issue of new matter is raised by virtue of the amendment to the specification, and withdrawal of the objection to the specification is solicited.

The claims had been objected to as set forth in numbered paragraph 4 on page 3 of the Office Action, for, *inter alia*, being improperly dependent and for reciting missing formulae. These claims have been canceled, and the new claims are believed to be properly dependent and to otherwise be non-objectable. Applicants submit this objection to be moot in view of the presentation of the new claims.

Claims 1 and 15-17 had been rejected under 35 U.S.C. § 112 as set forth in numbered paragraph 6 on page 4 of the Office Action. The bracketing and other details found wanting in the former claims are believed fully corrected in the newly presented claims. Applicants believe this rejection to be moot also.

Claims 1-20 were rejected under 35 U.S.C. § 103(a) as obvious over Nagy et al. U.S. patent 5,637,660 (hereinafter, *Nagy*). The inventors of *Nagy* are the same as in the present application except for the presence in the pending application of additional inventor Bradley P. Etherton. The present application is a continuation-in-part of the application which became the *Nagy* patent, to which priority is claimed under 35 U.S.C. § 120. The present specification contains the entire disclosure of the *Nagy* application.

The position of the Office is that the present claims disclose additional optional elements which describe only minor differences which are not patentably distinct. Applicants respectfully disagree. For example, the Office states that:

- a) instant claim 15 contains an additional option for Y wherein P is substituted for N. It is well known in the art that phosphorus and nitrogen have similar properties, and substitution of one for the other would be obvious. Further, Applicants disclose no

examples or unexpected properties of phosphorus in the specified position.

However, it is well known that catalytic activity is unpredictable. *Corona Co. v. Dovan*, 276 U.S. 358 (1928). *In re Doumani*, 126 U.S.P.Q. 408 (CCPA 1960). In view of this unpredictability, substitution of phosphinoalkyl groups for aminoalkyl groups is not obvious, as nitrogen is a compact central ligand atom without any low lying empty d orbitals, while phosphorus is considerably larger, and has a complete set of empty 3d orbitals. Phosphorus, for example, forms many pentavalent compounds such as phosphorus pentahalides and phosphorus oxytrihalides, which nitrogen cannot. These differences markedly affect the behavior of nitrogen and phosphorus ligands. For example, it is well known that rhodium tris(triphenylphosphine) complexes are highly efficient catalysts for the synthesis of oxo alcohols, whereas the corresponding triphenylamino complexes are not active.

Furthermore, because of the substantial difference between the pyridinyl and quinoxilinyll metal complex catalysts of the subject invention and other single site metal catalysts, any allegation that phosphinoalkyl groups would be an obvious substitution for alkylamino groups must be supported by a prior art reference to pyridinyl or quinolinyl single site complexes which suggests that these groups may be substituted for each other without destroying catalytic activity. *Ex parte Berger*, 108 U.S.P.Q. 236 (POBA 1952). A general but unsupported statement regarding obviousness is insufficient. *In re Soli*, 137 U.S.P.Q. 797 (CCPA 1963); *In re Wagner*, 152 U.S.P.Q. 552 (CCPA 1967). Applicants have no burden of going forward with proofs of non-obviousness until a *prima facie* case has been established.

The same comments extend to the Office's other contentions. For example, the Office States that:

- b) instant claim 15 contains additional options for R and X. The indicated groups are all well-known optional pendant groups used in polymerization catalysts. Applicants disclose no

examples or unexpected properties of these optional groups in the specified position.

However, not all pendant groups are created equally. Refer again for example, to the differences between triphenylphosphine and triphenylamine in oxo alcohol catalysts. Both these compounds are "well-known optional pendant groups". However, in oxo alcohols, one works, one doesn't.

The Office further concludes that:

- c) M is extended to include most of the transition series. It is well-known in the art to substitute various transition metals in polymerization catalysts to achieve specific polymerization results.

Once again, the conclusion of the Office is unsupported. For example, Pt and Pd are highly efficient hydrosilylation catalysts in addition-crosslinking organopolysiloxane compositions, however neither iron nor cobalt nor titanium demonstrate significant hydrosilylation activity. Copper is a catalyst for the explosive decomposition of acetylene. Silver, another transition metal, is not, however. Further, the metal environment in the single site catalysts of the subject invention is different from other metal catalysts. If the Office is to persist in alleging that substitution of Group 3 and 5 to 8 metals for Group 4 metals is an obvious expedient, the Office must first set forth a prior art reference<sup>1</sup> which suggests that these additional Groups of metals, with their different electron configurations, would be expected to behave similarly when ligated by pyridinyl and quinolinyl groups in polyolefin syntheses. Without a prior art reference, there is no *prima facie* case, and Applicants have no burden of going forward in

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<sup>1</sup> The Examiner's attention is respectfully drawn to U.S. patent 5,852,146, discussed on page 17, *infra*, which, however, is not prior art.

rebuttal. *In re Soli*, op. cit; *In re Grose*, 201 U.S.P.Q. 57 (CCPA 1979).<sup>2</sup> Applicants submit that the former rejection of claims 1-20 was untenable, and cannot be applied to new claims 21-70.

Claims 15-20 were stated to be not patentably distinct from claim 1 of U.S. Patent 5,637,660 (*Nagy*). While Applicants do not acquiesce to this rejection, for the reasons set forth previously, Applicants state on the record, through their attorney, that the present invention and the invention claimed in *Nagy*, U.S. Patent 5,637,660 were commonly owned at the time the present invention was made (37 C.F.R. § 1.78(c)). Therefore, no rejection of the claims under 35 U.S.C. § 103 can be maintained. 35 U.S.C. § 103(c).

Claims 15-20 have been rejected under the judicially-created doctrine of obviousness-type double patenting over *Nagy*, U.S. Patent 5,637,660. While Applicants, for the reasons set forth previously, believe the present claims to be patentably distinct from the claims of *Nagy* U.S. Patent 5,637,660, to expedite prosecution, enclosed herewith is the Terminal Disclaimer of common assignee Lyondell Petrochemical by the Assignee's attorney of record. Applicants submit that this Terminal Disclaimer is sufficient to overcome any rejection for obviousness-type double patenting.

Applicants wish to bring to the attention of the Office U.S. patent 5,852,146 which issued on December 22, 1998. This patent claims bridged metal bis(pyridinolates) and bridged metal bis(quinolines) in which the pyridinyloxy and quinolinyloxy groups are linked by a chemical bond or bivalent bridging group, for example a methylene or ethylene group. The '146 patent is derived from a CPA application claiming priority to its parent application filed June 27, 1996. Applicants submit that this patent is not prior art to the present invention, which claims priority to U.S. application Serial No. 08/423,232, filed April 17, 1995. Moreover, Example 1 of the present application is the same as Example 1 of its parent '232

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<sup>2</sup> These same arguments apply to the Office's comments set forth in ¶(d) of page 7 of the Office Action as well. However, it is noted that the comment that more than one pyridinyl group is disclosed but not claimed is incorrect, as claim 1, where a is 2 or 3 contains more than one pyridinyl group.

application, and is substantially the same as that of Examples 1 and 5 of U.S. patent 5,852,146, showing a reduction to practice<sup>3</sup> fully as extensive as the '146 patent prior to the filing date of the application which became the '146 patent.

Applicants submit that the claims are now in condition for Allowance, and respectfully request a Notice to that effect. If the Examiner believes that further discussion will advance the prosecution of the Application, he is highly encouraged to telephone Applicants' attorney at the number given below.

Respectfully submitted,

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Date: 2-17-99

**LYONDELL CHEMICAL WORLDWIDE, INC.**

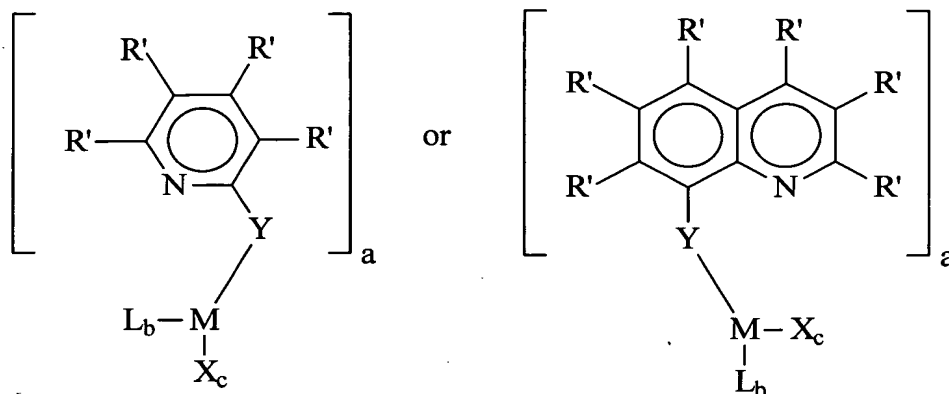
3801 West Chester Pike  
Newtown Square, PA 19703  
Phone - (610) 359-2000  
Fax - (610) 359-2095

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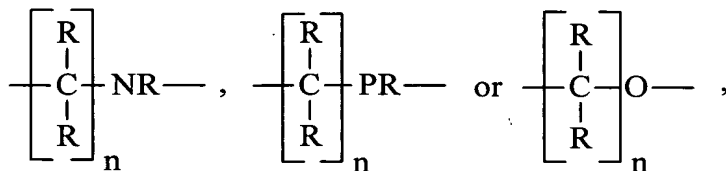
<sup>3</sup> It is noted that the '146 patent does not claim any compounds except bridged compounds.

# ABSTRACT OF THE DISCLOSURE

Disclosed is novel bidentate pyridine transition metal catalyst having the general formula



where Y is -O-, -S-, -N-, -P-,

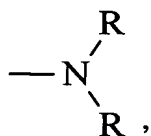


where each R is independently hydrogen, C<sub>1-6</sub> alkyl, or C<sub>6-14</sub> aryl;

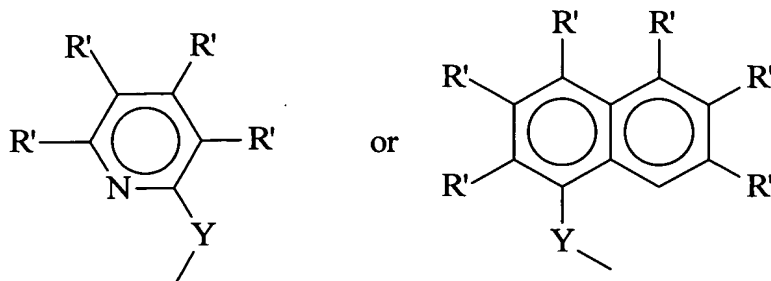
where each R' is independently R, C<sub>1-6</sub> alkoxy, C<sub>7-20</sub> alkaryl, C<sub>7-20</sub> aralkyl, halogen, or CF<sub>3</sub>;

where M is a Group 3 to 10 metal;

where each X is independently halogen, C<sub>1-6</sub> alkyl, C<sub>6-14</sub> aryl, C<sub>7-20</sub> alkaryl, C<sub>7-20</sub> aralkyl, C<sub>1-6</sub> alkoxy, or



L is X, cyclopentadienyl, C<sub>1-16</sub> alkyl-substituted cyclopentadienyl, fluorenyl, indenyl, or



where n is an integer from 1 to 4;

a is an integer from 1 to 3;

b is an integer from 0 to 2;

the sum of  $a+b \leq 3$ ;

c is an integer from 1 to 6; and

the sum  $a+b+c$  equals the oxidation state of M.

A4  
could